

# Gesture Commanding of a Robot with EVA Gloves

Completed Technology Project (2012 - 2012)



## Project Introduction

Gesture commands allow a human operator to directly interact with a robot without the use of intermediary hand controllers. There are two main types of hand gesture interfaces: data glove-based devices and computer vision techniques. Data glove-based devices are worn by the human and capture hand movements through embedded sensors. Computer vision techniques interpret hand movements by using the video feed from cameras. We will assess the feasibility of using both approaches when the person commanding a robot is wearing EVA gloves. This is because EVA gloves can restrict movements of the hand and affect gesture recognition accuracy and recognition speed. We plan to program a small robot to accept inputs from a data glove inserted into an EVA glove and from computer vision software that can recognize gestures when the user wears an EVA glove. We have a robot, data glove, and computer vision software so the effort will be on integrating these elements for an assessment. If the results of the assessment show an advantage of one technique over another for commanding a robot with EVA gloves, in-depth studies can be proposed to refine and evaluate the technique.

Gesture commanding can be applied and evaluated with NASA robot systems. Application of this input modality can improve the way crewmembers interact with robots during EVA. There is a need to assess the feasibility of using both approaches when the person commanding a robot is wearing EVA gloves.

## Anticipated Benefits

Technology developed will support the needs of the Human Research Program's Directed Research Project on Human-Robot Interaction. Future studies will be proposed to refine and evaluate the gesture commanding method more thoroughly and develop a full gesture vocabulary.



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## Organizational Responsibility

### Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

### Lead Center / Facility:

Johnson Space Center (JSC)

### Responsible Program:

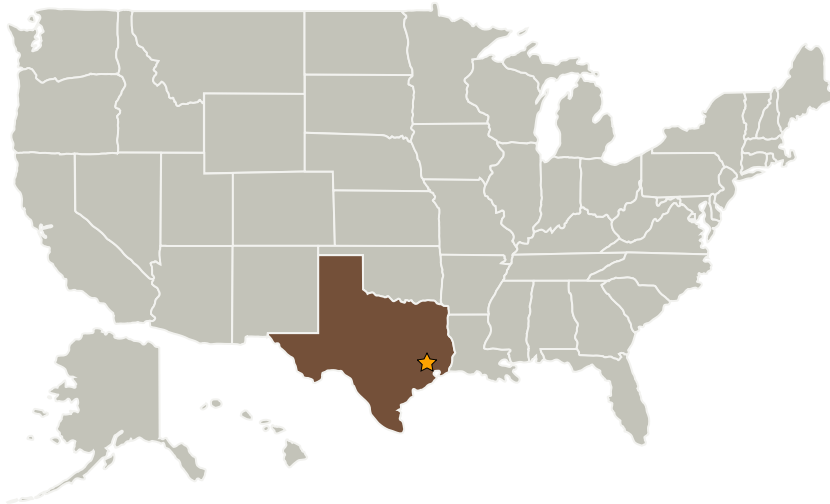
Center Innovation Fund: JSC CIF

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## Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
★ Johnson Space Center(JSC)	Lead Organization	NASA Center	Houston, Texas
Lockheed Martin Space Systems(LMSS)	Supporting Organization	Industry	Sunnyvale, California

## Primary U.S. Work Locations

Texas

## Project Management

**Program Director:**

Michael R Lapointe

**Program Manager:**

Carlos H Westhelle

**Project Manager:**

Aniko Sandor

**Principal Investigator:**

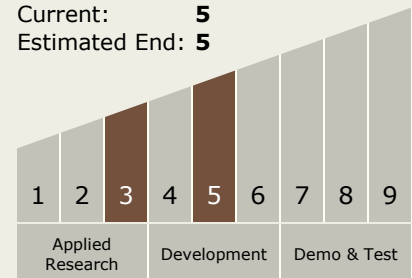
Aniko Sandor

## Technology Maturity (TRL)

Start: 3

Current: 5

Estimated End: 5



## Technology Areas

**Primary:**

- TX06 Human Health, Life Support, and Habitation Systems
  - TX06.2 Extravehicular Activity Systems
    - TX06.2.3 Informatics and Decision Support Systems